

ON A NEW SPECIES OF FLUSTRIDAE FROM ANTARCTICA
(BRYOZOA, CHEILOSTOMATA)

UNA NUEVA ESPECIE DE FLUSTRIDAE DE LA ANTARTIDA
(BRYOZOA, CHEILOSTOMATA)

Hugo I. Moyano G.*

ABSTRACT

On material collected in the South Shetland Islands area by the XXVI Chilean Antarctic Expedition, February 1990, a new species of Flustridae *Isoseculiflustra rubefacta* sp. n. is here proposed. This new name is introduced for coarse, flabellar, pink zoaria hitherto considered conspecific with those delicate, slender, non pink described as *I. tenuis* by Kluge, 1914.

KEYWORDS: Bryozoa, Flustridae, *Isoseculiflustra*, *I. rubefacta* sp. n. Taxonomy, Antarctica.

RESUMEN

Sobre la base de material recolectado por la XXVI Expedición Antártica Chilena en febrero de 1990 en el área de las islas Shetland del Sur, se describe una nueva especie de la familia Flustridae (Bryozoa, Cheilostomata): *Isoseculiflustra rubefacta* sp. n. Se propone este nuevo nombre para zoarios gruesos, ampliamente flabelados, de color rosado a púrpúreo considerados hasta ahora conespecíficos con *I. tenuis* (Kluge, 1914), especie cuyos zoarios delicados poseen, por el contrario, ramas agostas de color blanco-amarillento.

PALABRAS CLAVES: Bryozoa, Flustridae, *Isoseculiflustra*, *I. rubefacta* sp. n., Taxonomía, Antártida.

INTRODUCTION

Family Flustridae is a fairly large set of flexible, light calcified algae-mimetic marine bryozoan species inhabiting especially cold and temperate waters in both northern and southern hemispheres (Moyano, 1972). Most flustran species form ramified zoaria with flat, slender or wide, branches, yet a few slightly encrust solid substrata, e. g. *Hippoflustra variabilis* (Moyano, 1974). Many have interzoecial variously shaped avicularia and hyperstomial or endozoecial ovicells.

Appart from true flustran species that lack a

compensation sac for the extrusion of polipidial tentacles, there are several species in different families that have evolved typically flustran zoaria. Among these the genera *Himantozoum* and *Kluggella* (Bugulidae) (Hastings, 1943; Hayward, 1995) and the species *Kymella polaris* (Hippoporinidae) (Moyano, 1986) and *Adelascopora secunda* (Microporellidae) (Hayward & Thorpe, 1988; Moyano, 1989) from Antarctica; *Flustrapora magellanica* (Microporidae) (Moyano, 1970) from waters around the southern tip of South America and *Corbulipora tubulifera* (Cribrilinidae) from southern Australia (Bock & Cook, 1994).

Antarctic waters are inhabited by a relatively large flustran fauna comprising both the Flustridae proper and flustriform species of other families mentioned above. Most of antarctic Flustridae were discovered and described by Kluge (1914) and subsequent authors (Androsova, 1972a,b; Hayward & Thorpe, 1988; Hayward

Departamento de Zoología, Universidad de Concepción, Casilla 2407, Concepción, Chile.

& Winston, 1994; Hayward, 1995; d'Hondt, 1984; d'Hondt & Redier, 1977; Liu & Hu, 1991; López Gappa, 1982; Moyano, 1970, 1972, 1986, 1989). Among Kluge's species *Flustra tenuis* was described as having zoaria formed by thin and slender ramified fronds, with elongated avicularia provided with linguiform mandibles, situated in inner and outer zooecial rows, those of the latter being the terminal zooid of its row.

Along the Antarctic peninsula several authors have found flustran zoaria larger and coarser than those described by Kluge. These have a stable purple colour that fades slightly in ethanol, with wide ramified fronds. Although zooids and avicularia look similar to those of *F. tenuis*, the overall characteristics of the pink zoaria indicate that they feature in a different species to be described in this paper.

MATERIALS AND METHODS

The samples were collected and sorted by the author during the XXVI Chilean Antarctic Expedition, on 14th February 1990, at 60-70 m depth with a triangular trawl, in the Shetland Islands area, 62°12.7' S; 59° 31'W. The material studied filling a 1 dm³ jar, was fixed in 70% ethanol. All zoaria in this sample are flabellar and pink.

In addition one complete colony with slender yellowish-white branches was collected between Livingstone island and Deception island during sampling by the 1994 BENTART Spanish Antarctic Expedition to the Shetland Islands.

Zoaria were examined with stereomicroscope and the drawing were made with aid of a camera lucida.

Isoseculiflustra rubefacta n.sp.

Pl. 1, A-D

DIAGNOSIS: Zoarium erect, flexible, light calcified, pink or light purple, unilaminar, dichotomously divided, with wide flabellar fronds widening distally. Autozooids longer than wide, parallelepipedic, closed by a well delimited mem-

branous operculum. Kenozooids elongated, sometimes tapering distally, situated along the zoarial margins. Avicularia three quarters of autozooidal length distally tapering, situated along the zoarial border and in the middle of the fronds, with a triangular elongated-blunt or linguiform mandible; the very abundant marginal ones end a zoecial longitudinal row, whereas the internal ones are budded laterally where a zooidal longitudinal row bifurcates. Ovicell endozoecial having a calcified entoecium with fine radial ribs. Ovicells appear and develop as transversal zoarial bands looking as zoarial growing marks.

ETYMOLOGY: The latin name means "red-made" what alludes the distinctive light red or light purpurine colour of this species.

TYPES: Holotype UCCC 24096, a flabellate, pink colony, 9 cm height collected by the XXVI Chilean Antarctic Expedition, at 60-70 m depth, in the Shetland Islands area, 62°12.7' S; 59° 31'W.

Paratypes UCCC 24097, several colonies filling 1 dm³ jar, with the same collecting data as the holotype. Both are deposited in the Zoological Collection of the Zoology Department, Universidad de Concepción, Chile.

REMARKS

a) Colour: The characteristic purpurine tint of the colonies is stable slightly fading in 70% ethanol. Nevertheless in some parts of colonies this is missing probably due to the rupture of zooids and an apparent dilution in ethanol.

b) Form and size of zoaria: Fully grown colonies are widely flabellated reaching up to 10 or more cm high, fixed to the substrate by bundles of rhizoids originated dorsally from the branches. The lateral rims of branches are delimited by an almost continuous series of cuneiform avicularia, each one ending the zooidal longitudinal row from which was budded. Frequently the wide branches break up or tear longitudinally producing apparently more slender branches which are detected by lacking the typical cuneiform marginal avicularia.

c) Ovicells: These appear when colonies are more than 3 cm height and form horizontal bands. The bands are made of 6-8 horizontal ovicellar rows. In one zoarium the second ovicellar band

situated in a branch 90 vertical zooidal rows wide, is composed of 8 rows having 190 ovicells. These characteristics appear in all zoaria examined.

d) rhizoids: These cylindrical waving structures originate on the dorsal side of the unilamellar colonies. They grow vertically to base of colonies forming bundles which anchor colonies to substrates.

TABLE I. Zooidal structures measurements, mm; n = 20.

| | Min | Max | X | S |
|----------------------------------|-------|-------|-------|-------|
| Zooidal length | 0,875 | 1.125 | 1,026 | 0,077 |
| Zooidal width | 0,250 | 0,375 | 0,312 | 0,035 |
| Ovicell ectooecium length | 0,350 | 0,400 | 0,383 | 0,014 |
| Ovicell entoecium length | 0,250 | 0,325 | 0,291 | 0,023 |
| Ovicell width | 0,250 | 0,325 | 0,280 | 0,022 |
| Outer avicularia length | 0,675 | 0,950 | 0,845 | 0,078 |
| Outer avicularia width | 0,200 | 0,300 | 0,255 | 0,026 |
| Outer avicularia mandible length | 0,300 | 0,450 | 0,398 | 0,036 |
| Inner avicularia length | 0,750 | 0,900 | 0,843 | 0,051 |
| Inner avicularia width | 0,175 | 0,275 | 0,223 | 0,024 |
| Inner avicularia mandible length | 0,350 | 0,425 | 0,383 | 0,022 |

e) epizoa: The dorsal side of the colonies examined is mostly or totally covered by epibionts. Sometimes these are also present on the frontal side of colonies. Most common epibionts are other bryozoans, v. gr. *Celleporella antarctica*, *C. bougainvillei*, *Beania erecta*, etc. Nevertheless many other encrusting animals are present: small ascidians, bivalves, foraminiferans, scalpellids, etc.

f) avicularia: The form, distribution and number of these modified zooids define *Isoeculiflustra rubefacta* sp. n. and *I. tenuis* (Kluge). Marginal cuneiform avicularia in the new species actually make an almost continuous avicularian rim in which each avicularium represents the terminal zooid of its longitudinal row. In *I. tenuis* s. str. marginal avicularia do not form a continuous series as it is seen in Kluge's plate 32, fig. 5 and in pl. I, C of this work. Inner avicularia are evenly dispersed but tend to concentrate near the ovicellar horizontal rows.

DISCUSSION

According to Kluge's 1914 original description and illustration, *Flustra tenuis* is a species

with slender zoarial branches and lacking a special or notable colour.

Androsova (1972a:327) in describing samples from Ob' stations 15, 28, 41 of the Soviet Antarctic Expeditions and from stations 70, 99, 115 of the XII and XV French Antarctic Expeditions to Adelie Land stated that she had two types of zoaria: slender non pink ones "identichni tipovuiu ekzempliarom opisannim Kluge (1914)" that is, identical with type-specimens described by Kluge (1914) and, pink ones from stations 28 and 99. In addition Androsova (1972b: 95) stated again that *F. tenuis* zoaria are very variable but the type material consists of slender non pink zoaria and that in the material from the French Expedition to Adelie Land there were only wide flabelar zoaria of two types: small yellowish-white ones (50 mm height) and bigger pink ones (90-100 mm height).

Among the specimens collected by the German Antarctic Expedition 1980-81, López Gappa (1982) reported also the *F. tenuis* two zoarial types: "zoaria from stations 272 and 285 are reddish, thick, and have wide branches ... similar to those studied by Vigeland (1952)" and "... colonies from station 261 are yellowish, thin, with

slender branches". This author after citing Androsova's findings said: "However, a better understanding of the systematic status of these two "forms" must await the collection of further specimens".

Finally, Hayward, 1995:68-69 following Liu and Hu, 1991 called this species *Isosecuriflustra tenuis* (Kluge). Nevertheless the actual name should be *Isoseculiflustra tenuis* after the original paper by Liu and Hu 1991: 22, 143. In his description Hayward said that the colonies are broad, richly branching alluding evidently the flabellar pink zoaria previously reported by Androsova and López Gappa. He also cited these authors and added that one specimen from Signy Island retained its purplish colour when preserved in alcohol.

According to the informations obtained from the four authors discussed above and from zoaria studied in this research, there are two types of colonies representing two species under the common name of *Flustra tenuis* Kluge, 1914 or *Isoseculiflustra tenuis* (Kluge, 1914). Kluge's species forms delicate, slender yellowish-white zoaria and the new one *Isoseculiflustra rubefacta* n. sp. here proposed, build coarse, broad and pink zoaria. The dimensions and structure of autozooids, marginal kenozooids and avicularian types are similar, but marginal avicularia are more abundant in the new species as it is seen in pl. I, D. Moreover as demonstrated by Barnes (1994) the rear side of zoaria in the new species is heavily encrusted by epibionts, what is seen in all the type material. On the slender specimens of Kluge's species instead, epibionts are apparently scarce or wanting according to the original description, the observations of latter authors and the specimen here examined.

ACKNOWLEDGEMENTS

The author acknowledges the Instituto Antártico Chileno who sponsored the 1990 XXVI Chilean Antarctic Expedition; the Instituto Español de Oceanografía for the invitation and funding the participation of the author in the 1994 BENTART Spanish Antarctic Expedition and, finally the author thanks the Dirección de Investi-

gación Universidad de Concepción for funding part of this research (Grant 113.38.32-1).

BIBLIOGRAFIA

- ANDROSOVA, H. I. 1972a. Mshanki Cheilostomata Anasca Antarktiki y Subantarktiki. Issledovaniya Fauni Morei, 11 (19). Rezultati Biologicheskij Issledovaniy Sovetskij Antarkticheskij Ekspeditsii 5: 315-344.
- ANDROSOVA, H. I. 1972b. Marine Invertebrates from Adelie Land, collected by the XIIIth and XVth French Antarctic Expeditions. 6. Bryozoa. Tethys, Supplement, 4:87-102.
- BARNES, D.K.A. 1994. Communities of epibiota on two erect species of Antarctic Bryozoa. Journal of the marine biological Association of the U.K. 74: 863-872.
- BOCK, P. E. & P. L. COOK. 1994. Occurrence of three phases of growth with taxonomically distinct zooid morphologies. In: Ryland, J. S., Hayward P. & P. D. Taylor (Eds.) Biology and Paleobiology of Bryozoans: 33-36. Olsen & Olsen, Denmark.
- HASTINGS, A. B. 1943. Polyzoa (Bryozoa). I. Scrupocellariidae, Epistomiidae, Farciminariidae, Bicellariellidae, Aeteidae, Scrupariidae. Discovery Reports, 32:301-510.
- HAYWARD, P. J. 1995. Antarctic Cheilostomata Bryozoa. Oxford University Press Inc New York. 355 pp.
- HAYWARD, P. J. & J. P. THORPE. 1988. New Genera of Antarctic Cheilostome Bryozoa. Cah. Biol. Mar. 29:277-296.
- HAYWARD P. J. & J. E. WINSTON. 1994. New species of Cheilostomate Bryozoa collected by the U. S. Antarctic Research Program. Journal of Natural History, 28:237-246.
- HONDT, J.-L. D'. 1984. Nouvelle contribution à la connaissance des Bryozoaires marins des terres australes françaises. Comité national française des Recherches Antarctiques, 55:95-116.
- HONDT, J.-L. D'. & L. REDIER. 1977. Bryozoaires recoltés lors des campagnes d'été 1972 et 1974 aux Iles Kerguelen. Comité national française des Recherches Antarctiques, 42:215-296.
- KLUGE, G. A. 1914. Die Bryozoen der Deutschen Südpolar Expedition 1901-1903...I.. Die Familien Aeteidae, Cellularidae, Bicellariidae, Farciminariidae, Flustridae, Membraniporidae und Cribrilliniidae. Deutsche Südpolar-Expedition, 15, Zoologie 7:601-678.
- LIU X. & Y. HU. 1991. On the cheilostome bryozoans from the north-west waters off the Antarctic Peninsula. Studia Marina Sinica, 32: 7-160.
- LOPEZ GAPPA, J. J. 1982. Bryozoa, collected by the German Antarctic Expedition 1980-1981. 1. Flustridae. Meteor Forsch. Ergebnisse, D, 35: 35-41.
- MOYANO G., H. I. 1970a. *Flustrapora magellanica* n.

- gen. n. sp. (Bryozoa) Bol. Soc. Biol. Concepción, 42:59-65.
- MOYANO G., H. I. 1972. Familia Flustridae: Ensayo de redistribución de sus especies a nivel genérico. Bol. Soc. Biol. Concepción, 42:73-101.
- MOYANO G., H. I. 1974. Briozoos Marinos Chilenos II. Briozoos de Chile austral I. Gayana Zool. 30:1-41.
- MOYANO G., H. I. 1986. Estructura y sistemática del Briozoo Antártico Flustriforme *Kymella polaris* (Waters, 1904). Bol. Soc. Biol. Concepción, 57: 21-35.
- MOYANO G., H. I. 1989. Bryozoa microporélidos celariformes y flustriformes de la Antártica. Bol. Soc. Biol. Concepción, 60:161-172.
- VIGELAND, I. 1952. Antarctic Bryozoa. Det Norske Vid. Akad. Oslo, Sci. Res. Norw. Antarct. Exped. 1927, 1928 et sqq. 34:1-16.

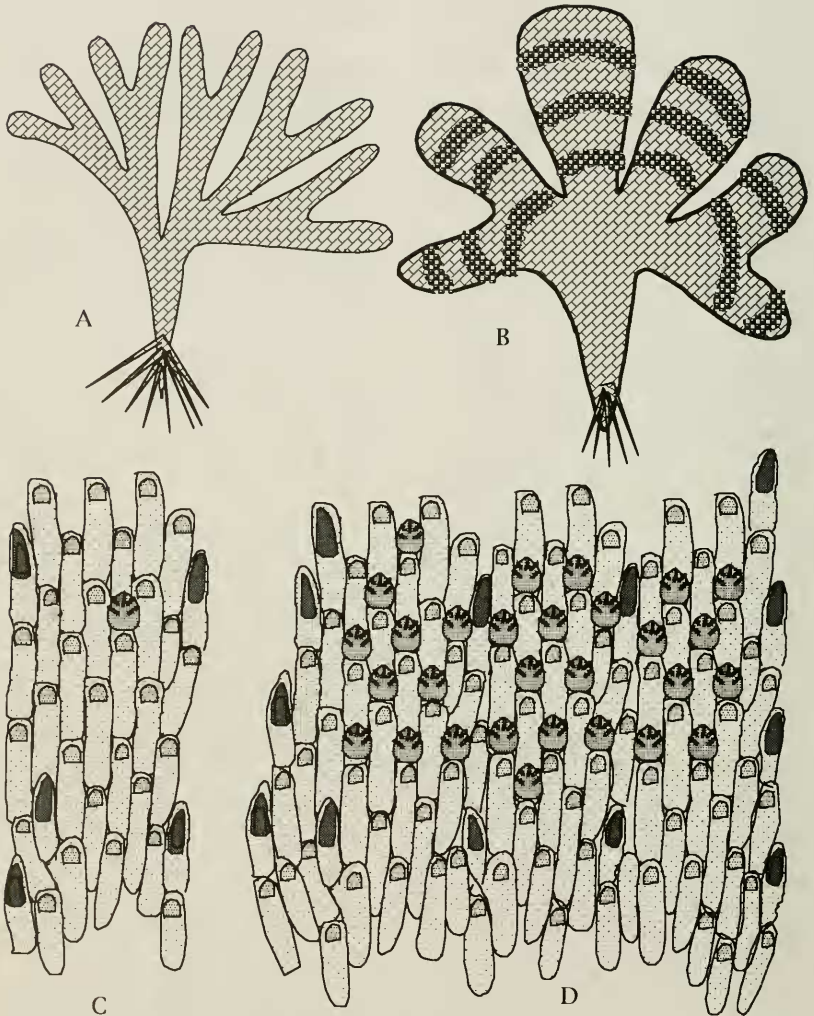


PLATE I. Diagrammatic and proportional representation of zoaria and zooids of the bryozoans *Isoseculiflustra tenuis* (Kluge), A, C. and *Isoseculiflustra rubefacta* n. sp., B, D. A. Zoarium of *I. tenuis*. B. zoarium of *I. rubefacta*. C and D Central fertile part of a branch of *I. tenuis* (C) and *I. rubefacta* (D). Note the difference on width, number of ovicells and the proportionally larger number of marginal avicularia in *I. rubefacta*. Moreover, the large number of ovicells in mature zoaria of *I. rubefacta* (B) depicting growing marks also make a significant difference between the new species and *I. tenuis* (Kluge).